Amendments to the Claims: This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims:

1. (Currently Amended) An integral solid state radiation coupler comprising:

(a) a radiation input end ~~and~~ ,

(b) a radiation output end,

said radiation input end being connected to said radiation output end through two radiation paths that diverge from said input ~~diverging~~ followed by ~~and~~ two ~~converging~~ radiation paths that converge ~~wherein said radiation path converge to~~ toward said output end at an angle 2θ ~~wherein θ is an interference angle calculated to produce an exiting radiation interference pattern of radiation entering said input end at~~ and

(c) an interference zone outside said output end,

wherein θ is an interference angle calculated to produce an exiting radiation interference pattern in said zone for radiation entering said input end and

wherein ~~said radiation entering said input end has an energy and~~ said interference pattern has a primary constructive interference fringe adapted to maximize energy transfer efficiency between said entering beam and a radiation receiver input end positioned in said interference zone by matching said primary constructive interference fringe mode to said radiation receiver input end mode.

2. (Original) The coupler according to claim 1 wherein said radiation is optical radiation.

3. (Original) The coupler according to claim 2 wherein said converging and diverging radiation paths are solid state optical channels.

4. (Original) The coupler according to claim 1 wherein said converging and diverging radiation paths are solid state waveguides.

5. (Original) The coupler according to claim 2 wherein said radiation is emitted by a laser and said laser is integral with said coupler input end.

6. (Currently Amended) An integral solid state radiation coupler comprising a radiation input end and a radiation output end, the coupler having a central axis extending along a "z" axis of a Cartesian co-ordinate system, the coupler further comprising:

a. an input radiation beam splitter comprising a first and a second diverging equidistant solid state radiation propagation channels extending from said coupler input, each of said channels diverging relative to said central axis;

b. a third and a fourth also solid state equidistant converging radiation propagation channels connected to said first and second diverging channels respectively, each of said third and fourth channels converging toward said z axis at a substantially same interference angle "θ" relative to said axis,

c. wherein:

i. radiation exiting said third and fourth channels generates ~~a~~ an interference pattern in an interference zone ~~of interference pattern~~, said zone extending by a distance $L_{int}/2$ on either side of a point on said z axis where a center line of a beam propagating along said third channel and a beam propagating along said fourth channel intersect; and ~~wherein~~

ii. said third and said fourth channels terminate prior to overlapping at or before the onset of said interference zone; and

d. said interference angle θ is calculated to optimize matching a primary constructive interference fringe mode in said interference zone to an input end ~~the~~ mode of an energy receptor placed in said interference zone.

7. (Original) The coupler according to claim 6 further comprising at least one phase delay element in at least one of said first, second, third or fourth channels.

8. (Original) The coupler according to claim 6 further comprising a first phase delay element in one of said first, or third channels and second phase delay element in one of said second or fourth channels.

9. (Original) The coupler according to claim 6 wherein said radiation is optical radiation.

10. (Original) The coupler according to claim 6 wherein said first second third and fourth channels are waveguides.

11. (Original) The coupler according to claim 6 wherein said radiation beam is optical radiation emitted by a laser and said laser is integral with said input beam splitter.

12. (Original) The coupler according to claim 6 wherein said coupler further comprises fifth and sixth substantially parallel channels extending between said first and third and said second and fourth channels respectively.

13. (Original) The coupler according to claim 12 wherein said first and second delay elements are connected to a driver in a push pull configuration.

14. (Currently amended) A solid state energy transfer system comprising:

A. a radiation source;

B. A solid state radiation coupler comprising a radiation input end and a radiation output end, the coupler having a central axis extending along a "z" axis of a Cartesian co-ordinate system, the coupler further comprising:

a. an input radiation beam splitter comprising a first and a second diverging equidistant solid state radiation propagation channels extending from said coupler input, each of said channels diverging relative to said central axis;

b. a third and a fourth also solid state equidistant converging radiation propagation channels connected to said first and second diverging channels respectively, each of said third and fourth channels converging toward said z axis at a substantially same interference angle "θ" relative to said axis,

c. wherein radiation exiting said third and fourth channels generates ~~a~~ an interference pattern in an interference zone ~~of interference pattern~~, said zone extending by a distance $L_{int}/2$ on either side of a point on said z axis where a center line of a beam propagating along said third channel and a beam propagating along said fourth channel intersect and wherein said third and said fourth channels terminate prior to overlapping at or before the onset of said interference zone; and

C. a radiation receptor having an input surface located within said interference zone;

wherein said interference angle θ is calculated to create a primary constructive interference fringe providing optimal matching of said interference fringe mode to said receptor input end mode.

15. (Original) The system according to claim 14 wherein said radiation is optical radiation, said receptor is a single mode fiber having a fiber mode field and said primary constructive interference fringe provides optimal matching to said fiber mode.

16. (Original) The system according to claim 15 wherein said single mode fiber input surface is in an x-y plane of said Cartesian coordinate system at a point in said interference zone wherein said constructive interference fringe mode best matches said fiber mode.

17. (Original) The system according to claim 14 wherein said single mode fiber input surface is in an x-y plane of said Cartesian coordinate system and is placed at a distance from one of said channel ends equal to the Rayleigh distance for optical radiation exiting said end.

18. (Original) The system according to claim 14 wherein said optical radiation source is a laser and said laser is integral with said input beam splitter.

19. (Original) The system according to claim 14 wherein said radiation receptor is fixedly mounted in position within said interference zone relative to said coupler.

20. (Original) The system according to claim 14 further comprising at least one phase delay element in at least one of said first, second, third or fourth channels for introducing sufficient phase delay to radiation propagating along said channel to shift said constructive interference fringe in said interference zone laterally outside of said input surface of said radiation receptor.

21. (Original) The system according to claim 20 further comprising a controller connected to said phase delay element for controlling the degree of said phase delay introduced by said phase delay element.

22. (Original) The system according to claim 20 further comprising a plurality of substantially coplanar adjacent radiation receptor input faces within said interference zone.

23. (Original) The system according to claim 22 wherein said radiation receptor input faces are input faces of additional radiation couplers.

24. (Original) The system according to claim 22 further comprising a driver for controlling said radiation phase delay.

25. A method for coupling a radiation beam to a first receptor input, the method comprising:

a. splitting said radiation beam into a first and a second substantially equal intensity beams propagating along first and second solid state equidistant diverging channels;

b. directing said split diverging beams to and along a third and a fourth also solid state equidistant converging radiation propagation channels respectively, said channels converging at an angle 2θ relative to each other, wherein said third and fourth channels terminate at an end point prior to overlapping;

c. forming an interference pattern of said converging third and fourth beams comprising at least one constructive interference fringe in an interference zone after exiting said third and fourth channels; and

d. positioning said radiation receptor input end in said interference zone at a point where said constructive interference fringe mode matches said first receptor input.

26. (Original) The method of claim 25 further comprising applying a phase delay to at least one of said radiation beams propagating along said channels to shift said constructive interference fringe in said interference pattern laterally away from said first receptor input.

27. (Original) The method of claim 26 further comprising positioning at least one more receptor input end adjacent said first receptor input end and shifting said constructive interference fringe from said first receptor input to said at least one more receptor input.